Biodiversity Data Journal 13: e154423
doi: 10.3897/BDJ.13.e154423

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Taxonomy & Inventories

Description of a new *Rhizotrogus* Latreille, 1825 (Scarabaeidae, Melolonthinae), from the Island of Pantelleria (Sicily Channel, Italy)

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Academic editor: Paulo Borges

Received: 31 Mar 2025 | Accepted: 16 May 2025 | Published: 02 Jul 2025

Citation: Sparacio I, Muscarella C, Di Giulio A, Ruzzier E (2025) Description of a new *Rhizotrogus* Latreille, 1825 (Scarabaeidae, Melolonthinae), from the Island of Pantelleria (Sicily Channel, Italy). Biodiversity Data Journal 13: e154423. https://doi.org/10.3897/BDJ.13.e154423

ZooBank: urn:lsid:zoobank.org:pub:48407873-20A8-4835-8189-17F406430DEE

Abstract

Background

Rhizotrogini comprises just over 45 taxa in Italy, some of which are endemic or subendemic. However, the elusive nature of several taxa, along with the uncertain taxonomic status of certain species, means that some species or populations within these taxa remain subjects of ongoing discussion and research.

New information

This contribution is devoted to the description of a new species of *Rhizotrogus* from the Island of Pantelleria (Sicily Channel, Italy), historically confused with *Rhizotrogus pallidipennis* Blanchard, 1851.

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Introduction

Italy, with its unique biogeographic history and territory extending into the Mediterranean Sea from the European continent enriched by countless islands and islets, is one of the main biodiversity hotspots in the Western Palaearctic (Myers et al. 2000, Mittermeier et al. 2005, Blondel et al. 2010). In this context, the Italian scarab fauna is amongst the most relevant in the European scenario, both in terms of native and endemic elements (Ballerio et al. 2010, Carpaneto et al. 2021) and non-native taxa resulting from human-mediated introductions (Ruzzier et al. 2020). In particular, 198 taxa are currently known in Sicily, 82 of which have been reported on circum-Sicilian islands (Arnone and Romano 2021, Muscarella 2022). Rhizotrogini Burmeister, 1855, is a large tribe of Melolonthinae Samouelle, 1819 (Coleoptera, Scarabaeidae), accounting for approximately 1400 species from the Palaearctic, Nearctic, Neotropical and Indomalayan Regions (Montreuil 2008). *Rhizotrogini* includes slightly more than 45 taxa in Italy, some of which are endemic or subendemic (e.g. Carpaneto et al. (2021), Uliana and Gallerati (2022), Fabbriciani et al. (2024)). However, the elusiveness of several taxa, combined with the unclear taxonomic status of some species, means that some species or populations of these taxa are still a source of discussion and objects of current research. This is the case of *Rhizotrogus pallidipennis* Blanchard, 1851 (Melolonthinae Rhizotrogini Burmeister, 1855), a species of the SW-Mediterranean chorotype originally described from Algeria (locus typicus: Boghar) (Blanchard 1851). This beetle, which is widespread in the Maghreb Region, the Iberian Peninsula and Balearic Islands (Baraud 1977, Baraud 1985, Baraud 1992, López-Colón 2000, Ballerio et al. 2010, Bezděk 2016, Carpaneto et al. 2021), reaches the eastern limit of its range on Pantelleria Island (Italy) (Arnone 2010, Ballerio et al. 2010, Carpaneto et al. 2021), where it has been reported on the basis of only a single sample and a few remains (Perazzini 1987, Ratti 1987). However, the identity of the population inhabiting Pantelleria has remained poorly understood given the limited material available thus far. This uncertainty was already supported by Ragusa (1893), who reported the recollection of *R. aestivus* (Olivier, 1789) on Pantelleria. This specimen, labelled “Pantelleria” and still present in the Ragusa collection, was recognised as a female of *R. pallidipennis* by Arnone (2010). In addition, the complexity associated with the recognition of this taxon, which belongs to the *aestivus* -species group (*sensu* Coca-Abia and Martín-Piera (1998), Coca-Abia (2003)), is confirmed by its multiple synonyms (Bezděk 2016). Research conducted on Pantelleria in recent years has allowed the collection of many samples of *Rhizotrogus* Latreille, 1825 which are attributable to *R. pallidipennis*. A careful review of the material collected, together with comparisons with *R. pallidipennis* from other localities, revealed that the species inhabiting Pantelleria Island belong to a taxon unknown to science. This paper aims to describe and illustrate this new species and provide an updated catalogue of Italian Rhizotrogini.

Materials and methods

The new species was observed directly in their habitat, photographed and sampled via an entomological net. Specimens from other entomological collections were also studied. The materials were identified via an Optika stereomicroscope. Photos of the habitus and other morphological characters were taken with a Canon Eos 100D camera equipped with a Macro Lens EF 1000 mm and mounted on a Manfrotto microslider movement system. The images were processed with CombineZP software and enhanced with Photoshop CS6 software. Morphological characteristics were measured (in mm) with a digital calliper or a lens equipped with a millimetric scale. The systematic approach adopted in the paper follows that provided in Bezděk (2016), Carpaneto et al. (2021) and other cited articles (see References).

ACRONYMS AND ABBREVIATIONS. Alberto Ballerio Private Collection, Brescia, Italy (ABCB); Biology Centre CAS, Institute of Entomology, České Budějovice, Czechia, (IECA); Calogero Muscarella Private Collection, Palermo, Italy (CMPC); Hungarian Natural History Museum Budapest, Hungary (HNHM); Museum of Zoology "Pietro Doderlein", University of Palermo, Italy (MZUP); Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy (MCSN); Museo di Storia Naturale di Venezia Giancarlo Ligabue, Venezia, Italy (MSNVE); Muséum National d'Histoire Naturelle Paris, France (MNHN); National museum, Prague, Czechia (NMPC); Natural History Museum of London, United Kingdom (BMNH); Naturhistorisches Museum, Basel, Switzerland (NHMB); Ignazio Sparacio Private Collection, Palermo, Italy (ISPC); Marco Uliana Private Collection, Codevigo, Italy (MUPC); Michele Rossini Private Collection, Pesaro, Italy (MRPC); Jan Matějíček Private Collection, Hradec Králové, Czechia (JMPC); a.s.l.: above sea level.

Taxon treatment

Rhizotrogus bentelrhianus Sparacio, Muscarella, Di Giulio & Ruzzier, sp. nov.

- ZooBank A35A7051-9DFA-4608-9631-7C288700CF0A

Materials

Holotype:

a. scientificName: Coleoptera; family: Scarabaeidae; taxonRank: species; nomenclaturalCode: ICZN; genus: *Rhizotrogus*; specificEpithet: *bentelrhianus*; island: Isola di Pantelleria; country: Italy; countryCode: IT; stateProvince: Siciliy; county: Trapani; locality: Southeastern slopes of Monte Gibelè, contrada Dietro l'isola; decimalLatitude: 36.777243; decimalLongitude: 12.025494; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 0.01; eventDate: 2024-03-07/09; year: 2024; month: 03; day: 07-09; individualCount: 1; sex: male; lifeStage: adult; preparations: dry mounted; recordedBy: Enrico Ruzzier; institutionCode: Museo civico di Storia naturale Giacomo Doria (MCSN); occurrenceID: 38C26D2D-8967-50DC-A0D4-6FBA03582E56

Paratypes:

a. scientificName: Coleoptera; family: Scarabaeidae; taxonRank: species; nomenclaturalCode: ICZN; genus: *Rhizotrogus*; specificEpithet: *bentelrhianus*; island: Isola di Pantelleria; country: Italy; countryCode: IT; stateProvince: Siciliy; county: Trapani; locality: Southeastern slopes of Monte Gibelè, contrada Dietro l'isola; decimalLatitude: 36.777243; decimalLongitude: 12.025494; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 0.01; eventDate: 2024-03-07/09; year: 2024; month: 03; day: 07-09; individualCount: 33; lifeStage: adult; preparations: dry mounted; recordedBy: Enrico Ruzzier; institutionCode: 1 ABCB; 1 BMNH; 12 CMPC; 1 IECA; 12 ISPC; 2 MCSNG; 1 MRPC; 1 MUPC; 1 MZUP;1 NMPC; occurrenceID: 495D1629-4D7A-54F5-816C-B8DA88D8ABC3

b. scientificName: Coleoptera; family: Scarabaeidae; taxonRank: species; nomenclaturalCode: ICZN; genus: *Rhizotrogus*; specificEpithet: *bentelrhianus*; island: Isola di Pantelleria; country: Italy; countryCode: IT; stateProvince: Siciliy; county: Trapani; locality: Southeastern slopes of Monte Gibelè, contrada Dietro l'isola; decimalLatitude: 36.777243; decimalLongitude: 12.025494; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 0.01; eventDate: 2024-03-07/09; year: 2024; month: 03; day: 07-09; individualCount: 5; lifeStage: adult; preparations: stored in 96% EtOH; recordedBy: Enrico Ruzzier; institutionCode: Museo civico di Storia naturale Giacomo Doria (MCSN); occurrenceID: 9B169CD8-457C-50EA-9E5D-537D611C69FF

c. scientificName: Coleoptera; family: Scarabaeidae; taxonRank: species; nomenclaturalCode: ICZN; genus: *Rhizotrogus*; specificEpithet: *bentelrhianus*; island: Isola di Pantelleria; country: Italy; countryCode: IT; stateProvince: Siciliy; county: Trapani; decimalLatitude: 36.759208; decimalLongitude: 12.019939; geodeticDatum: WGS84; coordinateUncertaintyInMeters: 0.01; eventDate: 2024-03-08; year: 2024; month: 03; day: 08; individualCount: 1; lifeStage: adult; preparations: dry mounted; recordedBy: Enrico Ruzzier; institutionCode: NMPC; occurrenceID: 2096A656-C77B-57B2-8E5F-F7AF0379C11B

d. scientificName: Coleoptera; family: Scarabaeidae; taxonRank: species; nomenclaturalCode: ICZN; genus: *Rhizotrogus*; specificEpithet: *bentelrhianus*; island: Isola di Pantelleria; country: Italy; countryCode: IT; stateProvince: Siciliy; county: Trapani; locality: Montagna Grande; eventDate: 1995-05-01; year: 1995; month: 5; day: 01; individualCount: 1; lifeStage: adult; preparations: dry mounted; recordedBy: Ignazio Sparacio; institutionCode: ISPC; occurrenceID: 7E3B57CE-4B0A-553C-A35D-BBA015CBEB31

e. scientificName: Coleoptera; family: Scarabaeidae; taxonRank: species; nomenclaturalCode: ICZN; genus: *Rhizotrogus*; specificEpithet: *bentelrhianus*; island: Isola di Pantelleria; country: Italy; countryCode: IT; stateProvince: Siciliy; county: Trapani; locality: Lago di Venere; eventDate: 2022-03-01; year: 2022; month: 03; day: 01; individualCount: 1; lifeStage: adult; preparations: dry mounted; recordedBy: S. Costa, M. Lo Valvo and G. Mascarello; institutionCode: CMPC; occurrenceID: 17A46CAD-882D-5CE1-88A1-B896037E5F77

f. scientificName: Coleoptera; family: Scarabaeidae; taxonRank: species; nomenclaturalCode: ICZN; genus: *Rhizotrogus*; specificEpithet: *bentelrhianus*; island: Isola di Pantelleria; country: Italy; countryCode: IT; stateProvince: Siciliy; county: Trapani; locality: Montagna Grande; eventDate: 1985-05-04; year: 1985; month: 05; day: 04; individualCount: 1; lifeStage: adult; preparations: dry mounted; recordedBy: E. Ratti; institutionCode: MSNVE; occurrenceID: 17A46CAD-882D-5CE1-88A1-B896037E5F77

g. scientificName: Coleoptera; family: Scarabaeidae; taxonRank: species; nomenclaturalCode: ICZN; genus: *Rhizotrogus*; specificEpithet: *bentelrhianus*; island:

Isola di Pantelleria; country: Italy; countryCode: IT; stateProvince: Siciliy; county: Trapani; locality: M. Gibele; eventDate: 1984-05-03; year: 1984; month: 05; day: 03; individualCount: 1; lifeStage: adult; preparations: dry mounted; recordedBy: E. Ratti and G. Rallo; institutionCode: MSNVE; occurrenceID: 17A46CAD-882D-5CE1-88A1-B896037E5F77

Description

Body length, including the head and pygidium, was 16.9 mm (Fig. 1A). Dorsal side brown with reddish pronotum. Antennae, legs and ventral side light brown; scutellar shield, suture and margins of elytra, apex of femora and tarsomeres blackened. The whole head is densely and irregularly punctured and punctures often merge; the clypeus is subtrapezoidal in the dorsal view, margins are narrowly raised and the anterior margin is slightly indented at the middle. Frontoclypeal suture distinct, subrectilinear, slightly raised. Clypeus and frons with tiny, raised, microsetae; head margins with moderately long, erect setae. Antennae 10–segmented, 1st antennomere clavate, 0.52× as long as antennomeres 2–7 with a row of long, dense setae on the posterior edge, 2nd subtriangular with dilated apex, 3–4 short and subrectangular, 5th short with slightly protruding anterior edge, antennal club 3-segmented, 2.1× as long as antennomeres 2–7.Pronotum subtrapezoidal, 1.8× as wide as long, with maximum width in the basal third, sides regularly rounded and crenulated, anterior angles obtuse, posterior angles obtuse, not protruding, posterior margin protruding backwards towards the middle. The surface is glabrous, except for long setae along the anterior and lateral margins, microreticulated with sparse and simple punctures (interpunctural distance 2 to 4 times the punctural diameter); the anterior and basal beads are complete and flattened. Scutellum subtriangular, 1.3× as wide as long, with fine sparse punctures, partially covered by dense and long setae. Elytra elongate, 1.3× as wide as long, broadest in the distal half, angled in the pre-apical region, humeral callus distinct; 1st interstria very widened at the base, 1st and 2nd stria raised and well evident interstriae, 3rd stria obsolete; surface glabrous, with long setae only along the lateral and apical margins; surface microreticulated with punctures deep, dense and sometimes confluent. Integument shiny and covered by fine microreticulations with deep and sparse punctures. Propygidium with sparse micropunctures; pygidium with medium-sized and sparse, large and simple punctures (interpunctural distance 3 to 6 times the punctural diameter). Abdomen with ventrites hollow in the middle with very small and sparse punctures. Anterior tibia 3-toothed, proximal tooth weak, distal tooth slightly protruding. Posterior tibiae subrectilinear, transversal carina located at approximately half the tibial length, with six teeth on the dorsal margin. The first three tarsi of the forelegs visibly notched along the inferior–lateral margin (4–5 denticles) with the distal denticle and were much more developed (Fig. 3A); the metatarsus was 1.4× as long as the metatibia. Claws distinctly curved, with an elongated basal denticle. Aedeagus (Fig. 3H) with the distal third of parameres narrow and elongated; apex very pointed in lateral view. Endophallus (Fig. 3G) with rounded and poorly-developed posterior portion and two bulges (diverticules) barely distinct from the main body at sides of the ejaculatory ductus;

ventral raspulae very developed, the lateral-dorsal ones smaller, the surface between the ventral and lateral dorsal raspulae is rough and with large punctures.

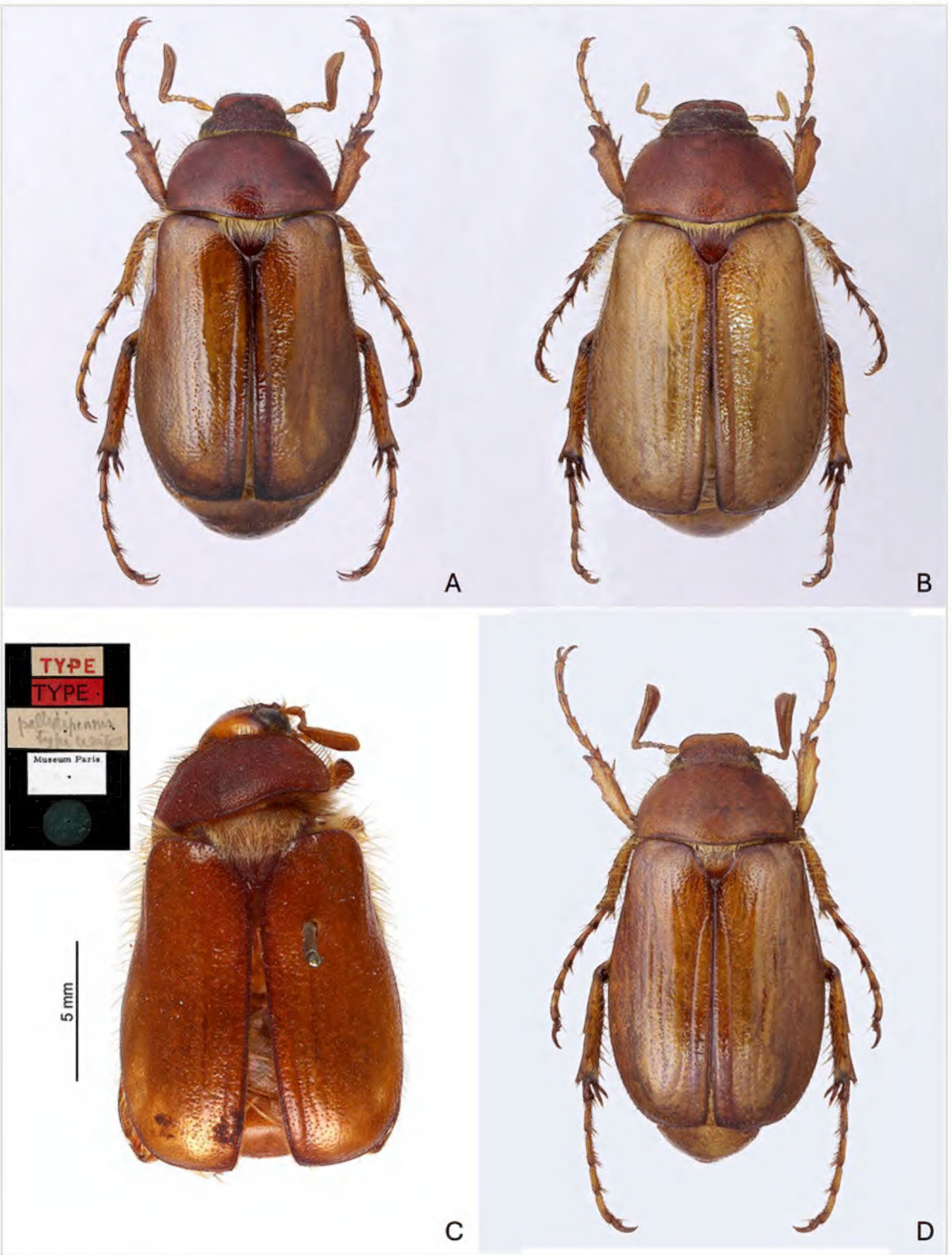

Figure 1. doi

Rhizotrogus bentelrhianus sp. nov. from Sicily, Pantelleria Island (Trapani, Sicily Channel), south-eastern slopes of Monte Gibelè, contrada Dietro l'isola. **A** holotype, male (body length 16.9 mm); **B** Paratype, female (body length 16.5 mm); **C** *Rhizotrogus pallidipennis*, type from Algeria, MNHN; **D** *Rhizotrogus pallidipennis*, male, from Spain, Puente de la Sierra, Jaén (body length 17.2 mm).

Variability: Compared with the holotype, the male paratypes do not show substantial morphological variation. The total length varies from 15.8 to 18.2 mm, with posterior

tibiae bearing 5 - 8 teeth on the dorsal margin. The two female paratypes (Fig. 1B) have total body lengths of 16.3 and 16.5 mm; pronotum transverse (1.8× wider than long) and stouter elytra (1.2× longer than wide); elytra with a rougher surface; antennae and tarsi shorter: antennal club 3–segmented approximately as long as the antennomeres 2–7, metatarsus 1.1× as long as the metatibia; propygidium and pygidium microreticuled with medium-size sparse and deep punctures (Fig. 3D).

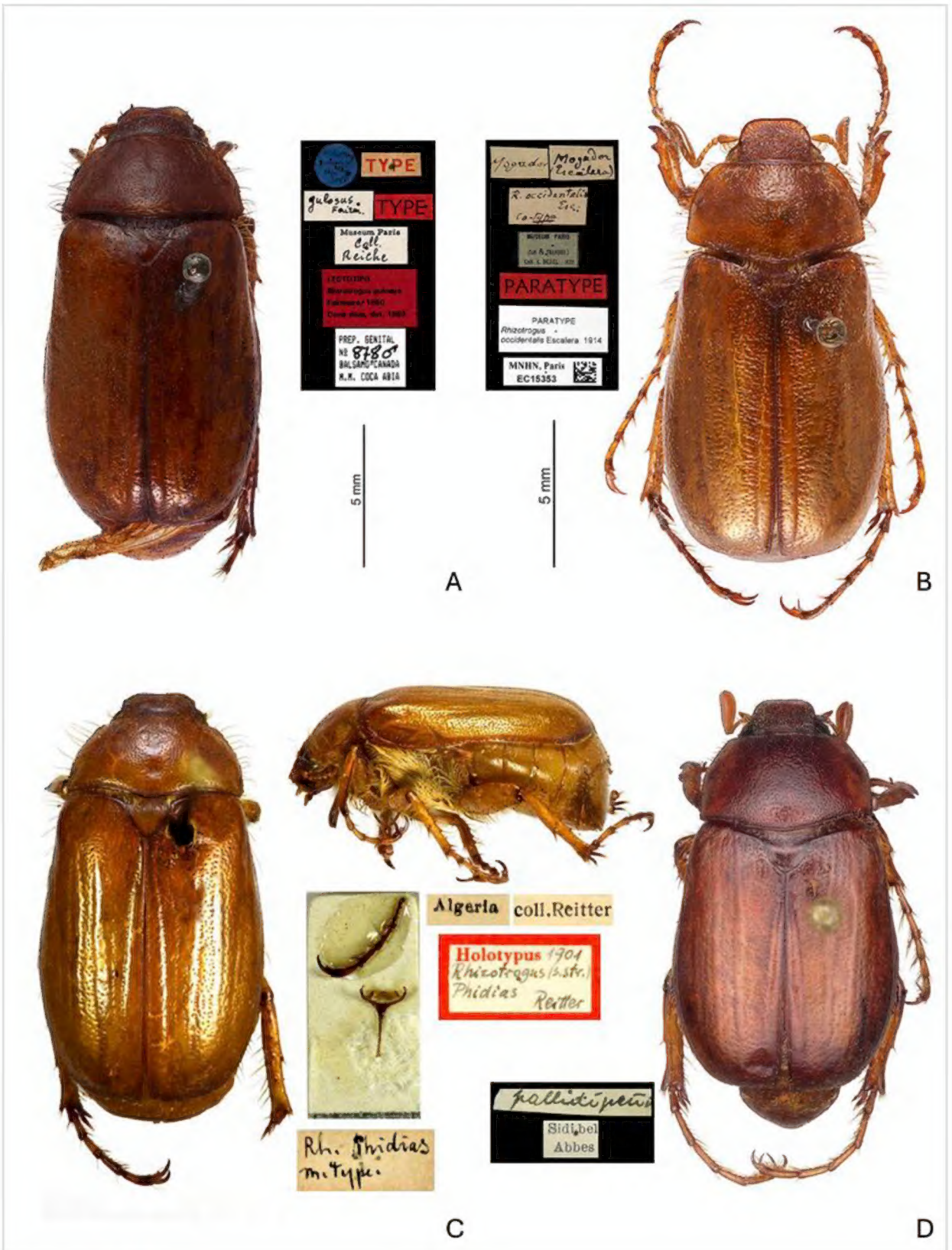

Figure 2. doi

A *Rhizotrogus gulosus*, lectotipo (synonym of *R. pallidipennis*) from Algeria, MNHN; **B** *Rhizotrogus occidentalis* Escalera 1914 from Mogador, paratype (synonym of *R. pallidipennis*); **C** *Rhizotrogus phidias*, holotype (synonym of *R. pallidipennis*) from Algeria, HNHM; **D** *Rhizotrogus pallidipennis* from Algeria, Sidi bel Abbes, NHMB (these latter specimens most probably belong to a different species).

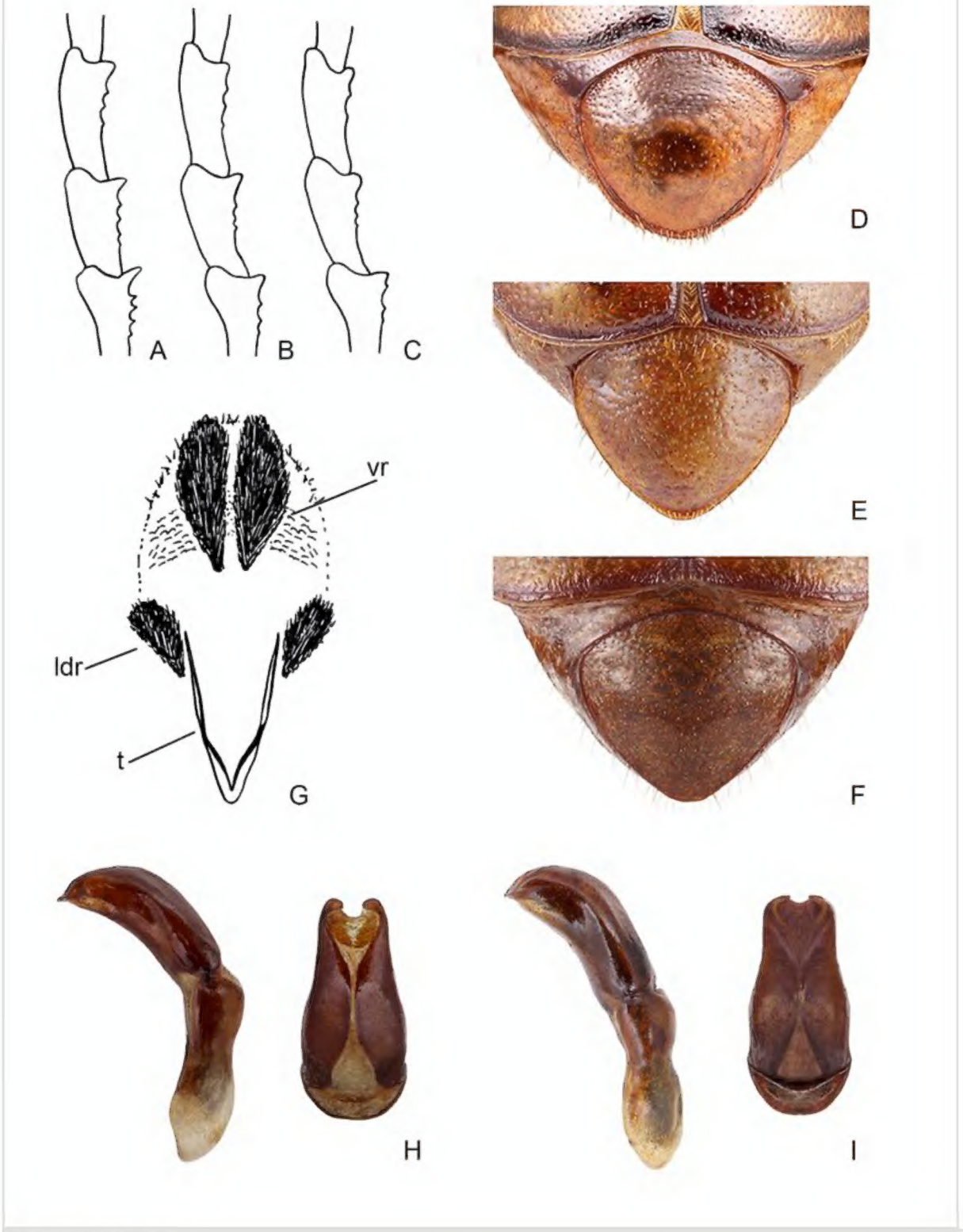

Figure 3. doi

Rhizotrogus bentelrhianus sp. nov.: **A** hind tarsomeres in lateral view; **D** pygidium in dorsal view; **G** endophallus (vr = ventral raspulae; ldr = latero-dorsal raspulae; t = tigilla); **H** lateral and dorsal view of the aedeagus. *Rhizotrogus pallidipennis* from Spain: **B** hind tarsomeres in lateral view; **E** pygidium in dorsal view; **I** lateral and dorsal view of the aedeagus. *Rhizotrogus pallidipennis* from Morocco: **C** hind tarsomeres in lateral view; **F** pygidium in dorsal view.

Diagnosis

Rhizotrogus bentelrhianus sp. nov. is characterised by glossy integuments, bicolour colouration with a brick-red pronotum and yellow elytra (Fig. 1A and B), a clypeus feebly recessed on the anterior edge, a pronotum that is regularly rounded with the posterior edge distinctly bisinuate and protruding anteriorly, posterior angles

protruding, shorter and sparser anterior edge bristles, elytral interstria 3 and 4 scarcely evident and protarsomeres 1–4 distinctly denticulate on the infero-lateral edge (Fig. 3A). The aedeagus is narrower and pointed anteriorly (Fig. 3H). *Rhizotrogus pallidipennis* is a uniformly brown–yellow or red–brown species that possesses matt integuments, especially on the pronotum (see Baraud (1977), Baraud (1985), Baraud (1992); Fig. 1C and D); the anterior margin of the clypeus is distinctly hollow in the centre, the pronotum is more angular on the sides with the posterior edge less sinuate, posterior angles rounded and not protruding, punctures larger and more superficial, bristles of the anterior edge long and dense, elytra regularly rounded at the apex with punctuation smaller and sparser and, especially in Spanish samples, interstria 3 and 4 distinctly raised and evident. The denticulation of the inferior-lateral edge of the first three tarsomeres of the forelegs is slightly prominent in the first two (with 3–4 denticles) and is often absent in the 3rd (Fig. 3B and C); the punctuation of the pygidium is coarser and denser (Fig. 3E and F). The aedeagus is more dilated in the anterior third and less pointed at the apex (Fig. 3I). A broad variability in the endophallus morphology was reported for *R. pallidipennis* (Martín Piera and Coca Abia 1992, Coca-Abia and Martín-Piera 1998), particularly in the development of ventral raspulae which are constantly well developed in *R. bentelrhianus* n. sp.

These morphological differences are confirmed through comparisons between *R. bentelrhianus* n. sp. and *R. pallidipennis*from Algeria, Morocco and Spain. The type material of taxa previously considered synonyms of *R. pallidipennis* from North Africa was also examined (Fig. 1C and Fig. 2A-C). Many of these synonyms have long been recognised. Reitter (1902) synonymised *R. vexator* from Menorca with *R. lepidus*, also from Menorca. Baguena Corella (1967) regarded *R. anachoreta* (with *R. signatitarsis* as its synonym) and *R. lepidus* (= *vexator*) as valid taxa, but noted that *R. lepidus* is "Extraordinariamente afin a *anachoreta*...". Baraud (1971), after examining numerous topotypical materials, considered *R. anachoreta* from southern Spain (Malaga) to be synonymous with *R. pallidipennis* (see also Peyerimhoff (1945)). For the European fauna, Baraud 1977 and Baraud 1992 reported *R. areolus* from Spain and Portugal, *R. lepidus* (= *vexator*) endemic to the Balearic Islands and *R. pallidipennis* for the Iberian Peninsula (= *anachoreta*; = *signatitarsis*). For the North African fauna, Baraud (1985) reported *R. pallidipennis* (= *anachoreta*) in Algeria and Morocco (in addition to the Iberian Peninsula) and *R. phidias* (= *occidentalis*), described for Algeria, in Morocco. *Rhizotrogus lepidus* was synonymised with *R. pallidipennis* by Martín Piera and Coca Abia (1992). Coca-Abia (1995), through examination of the type (see Fig. 2C), also considered *R. gulosus* from Algeria to be synonymous with *R. pallidipennis*. Later, through further examination of typical material, Coca-Abia and Martín-Piera (1998) included *R. areolus* amongst the synonyms of *R. pallidipennis*. Finally, Montreuil (1997) attributed the populations from Menorca described as *Amphimallon menorcanum* to *R. pallidipennis*.

All synonyms of *R. pallidipennis* (see Smetana and Král 2006 and Bezděk 2016) are given in Table 1.

Table 1.

Lixt synonymies

TAXON	COUNTRY	LOCUS TYPICUS
Rhizotrogus pallidipennis Blanchard 1851: 146	ALGERIA	"*Algérie (Boghar)*"
Rhizotrogus anachoreta Rosenhauer 1856: 120	SPAIN	"*Sierra de Ronda* [Malaga]"
Rhizotrogus gulosus Fairmaire 1860: 438	ALGERIA	"*Algérie (Collect. Reiche)*"
Rhizotrogus signatitarsis Chevrolat 1866: 102	SPAIN	"*Valladolid, le long du Canal de Léon*"
Rhizotrogus lepidus Schafuss 1869: 16	SPAIN - Balearic Islands	"*Menorca, See de Bufereta, Arenal de Bini Malla* [Minorca, Bufereta, Binimel.la beach]"
Rhizotrogus vexator Schafuss 1869: 17	SPAIN - Balearic Islands	"*Menorca… Mahon* [Minorca, Mahón]"
Rhizotrogus areolus Reitter 1902: 203	SPAIN	"*Gibraltar*"
Rhizotrogus phidias Reitter 1902: 216	ALGERIA	"*Algier*"
(Amphimallon) menorcanum Reitter 1902: 241	SPAIN - Balearic Islands	Minorca. See Montreuil, 1997
Rhizotrogus occidentalis Escalera 1914: 172	MOROCCO	"*Mogador, Mskala, Glaui, Casablanca, Ued Draa*"

Comparison material:

Rhizotrogus pallidipennis Blanchard, 1851

ALGERIA • 1 specimen; Museum Paris / *pallidipennis* type ... / TYPE / TYPE; male; MNHN. • 1 specimen; ..... / *gulosus* Fairm. / TYPE / TYPE / Museum Paris Coll. Reiche; LECTOTIPO / *Rhizotrogus gulosus* Fairmaire, 1860 / Coca Abia, det. 1993 / Prep. Genital n. 878 M Balsamo Canada M.M. Coca Abia; MNHN. • 1 specimen; Algeria; *Rh. Phidias* m. Type; coll. Reitter; Holotypus 1901 / *Rhizotrogus* (s. str.) *Phidias* Reitter; HNHM. • 1 specimen; *pallidipennis* Sidi bel Abbes; NHMB.

MOROCCO • 1 specimen; Mogador (Escalera); Mogador / Museum Paris - Coll. Ph. François - Coll. L. Bedel 1922 /*Rhizotrogus occidentalis* Esc: Co-typo / PARATYPE / Paratype - *Rhizotrogus -occidentalis* Escalera 1914 / MHNH - Paris EC15353 (Fig. 2D). • 1 specimen; Moyen Atlas, Azrou Ifrane area; 26 Apr. 2014; legit O. Boilly, JMPC. • 3 specimens; MA cent. Moyen Atlas, 11 Km NW Ifrane, Ifrane NP, okraj lesa *Quercus*, 33°34'26.4N, 5°12'13"W; 6-7.V.2015 leg. David Frank, IECA. • 1 specimen; Ifrane 6 km NWW; 6.v.2015, 33°33'38"N, 5°10'57"W, lgt. Ondřej Konvička, IECA.

SPAIN • 8 specimens; Puente de la Sierra, Jaén; 31 Dec. 2013; legit M. López; ISPC (Fig. 2C). • 3 specimens, Ayora (Valencia); 8 Nov 1979; legit J.J.L. Colon; 1 in MZUP and 2 in CMPC.

Etymology

The specific name "*bentelrhianus*" is derived from the Latinisation and masculinisation of the ancient Arabic name of Pantelleria Island: Bent El-Rhià "Daughter of the wind".

Distribution

Rhizotrogus bentelrhianus sp. nov. is known only from Pantelleria Island (Trapani, Sicily Channel, Italy).

Biology

This species is active from early March until the beginning of May, at both low (Lago di Venere) and high altitudes on Pantelleria: Monte Gibelè, Calca del Fillio 600 m a.s.l.; Montagna Grande 800 m a.s.l. (Perazzini 1987, Ratti 1987, Arnone et al. 1995, Ballerio et al. 2011). Notably, the phenology of *R. pallidipennis*, which is based primarily on observations of Spanish populations, appears to span almost the entire year, with a relatively high demographic concentration in the late winter and early spring months (Coca-Abia and Martín-Piera 1998, López-Colón 2000). Given our observations, *R. bentelrhianus* seems to be crepuscular, with males and females emerging simultaneously from the native Mediterranean scrub (Fig. 4A and B); emergence takes place between 6.30 and 7.00 p.m. CET. Once in the air, the beetles disperse in hovering flight amongst the canopy of the vegetation itself. Occasionally, the species has been recorded under stones, where it retreats during the day. The species did not respond to UV light. *Rhizotrogus bentelrhianus* has also been observed by one of the authors (ER) while feeding on leaves of *Cistus* sp. (Cistaceae) at night (Fig. 4 C).

Updated checklist of Italian Rhizotrogini

Genus *Amadotrogus* Reitter, 1902

Amadotrogus insubricus (Burmeister, 1855)

Distribution: Continental and Peninsular Italy, Sicily (Fabbriciani et al. 2024).

Amadotrogus luigionii Fabbriciani, Patacchiola and Boschin, 2024

Distribution: Tyrrhenian coast (Endemic, Fabbriciani et al. (2024)).

Amadotrogus quercanus (Burmeister, 1855)

Distribution: Reported for the northern regions and those on the Adriatic and Ionian coasts (Fabbriciani et al. 2024).

Amadotrogus vicinus (Mulsant, 1842)

Distribution: Sardinia (Subendemic, Fabbriciani et al. (2024)).

Genus *Amphimallon* Latreille, 1825

Amphimallon assimile (Herbst, 1790)

Distribution: Continental and Peninsular Italy, Sicily (Carpaneto et al. 2021).

Amphimallon atrum atrum (Herbst, 1790)

Distribution: North-western Italy (Carpaneto et al. 2021).

Amphimallon burmeisteri Brenske, 1886

Distribution: Continental Italy (Carpaneto et al. 2021).

Amphimallon fuscum (Scopoli, 1786)

Distribution: Continental and Peninsular Italy, Sicily (Carpaneto et al. 2021).

Amphimallon gianfranceschii Luigioni, 1931

Distribution: Southern Apulia (Endemic, Patacchiola and Fabbriciani (2021)).

Amphimallon javeti Stierlin, 1864

Distribution: Southern Calabria and Sicily (Endemic, Ballerio et al. (2011)).

Amphimallon majale majale (Razoumowsky, 1789)

Distribution: Continental Italy (Carpaneto et al. 2021).

Amphimallon montanum Zur Strassen, 1954

Distribution: Sardinia (Endemic), doubtful species described on a single female (Ballerio et al. 2011).

Notes: Species considered doubtful or requiring confirmation.

Amphimallon ochraceum (Knoch, 1801)

Distribution: Continental and Peninsular Italy (Carpaneto et al. 2021).

Amphimallon pini (Olivier, 1789)

Distribution: North-western Italy (Carpaneto et al. 2021).

Amphimallon solstitiale tropicum (Gyllenhal, 1817)

Distribution: Continental and Peninsular Italy (Patacchiola and Fabbriciani 2021). Removed from Sardinia (Rattu et al. 2020).

Amphimallon vitalei Luigioni, 1932

Distribution: Southern Calabria and Sicily (Endemic, Patacchiola and Fabbriciani (2021)).

Genus *Aplidia* Hope, 1837

Aplidia attenuata Reiche, 1862

Distribution: Sardinia (species inquirenda, type unknown) (Rattu et al. 2020).

Notes: Species considered doubtful or requiring confirmation.

Aplidia etrusca (Kraatz, 1882)

Distribution: Peninsular Italy (Endemic) (Carpaneto et al. 2021). Doubtful presence in Sardinia (Rattu et al. 2020).

Aplidia hirticollis (Burmeister, 1855)

Distribution: Calabria, Sicily and Malta (Carpaneto et al. 2021). Doubtful presence in Sardinia (Rattu et al. 2020).

Aplidia massai (Baraud, 1975)

Distribution: Sicily: river mouth Simeto (Endemic, Carpaneto et al. (2021)).

Aplidia transversa transversa (Fabricius, 1801)

Distribution: Continental and Peninsular Italy (Carpaneto et al. 2021). Doubtful presence in Sardinia (Rattu et al. 2020).

Aplidia villigera (Burmeister, 1855)

Distribution: Sicily (Endemic, Carpaneto et al. (2021)).

Genus *Firminus* Coca-Abia, 2003

Firminus baudii (Brenske, 1886)

Distribution: Calabria (Endemic, Carpaneto et al. (2021)).

Firminus bellieri (Reiche, 1862)

Distribution: Sardinia (Subendemic, Rattu et al. (2020)).

Firminus ciliatus ciliatus (Reiche, 1862)

Distribution: Apennine Italy (Endemic, Arnone et al. (2014)).

Firminus fossulatus (Mulsant and Rey, 1859)

Distribution: Sardinia (Subendemic, Carpaneto et al. (2011)).

Firminus massai Arnone, Lo Cascio and Grita, 2014

Distribution: Sicily: Aeolian Archipelago (Endemic, Arnone et al. (2014)).

Firminus procerus (Baudi, 1870)

Distribution: Central Apennines (Endemic, Carpaneto et al. 2021).

Genus *Geotrogus* Guérin-Menéville, 1842

Geotrogus euphytus lamantiai (Sparacio, 2014)

Distribution: Sicilian Channel: Pantelleria Island (Endemic, Sparacio (2014)).

Geotrogus genei (Blanchard, 1851)

Distribution: Sardinia and Capraia Island (Subendemic, Carpaneto et al. (2021)).

Geotrogus maraventanoi (Sparacio, 2018)

Distribution: Sicilian Channel: Lampedusa and Lampione Islands (Endemic, Sparacio (2018)).

Geotrogus michaelis (Sparacio, 2014)

Distribution: Sicily: Province of Trapani (Endemic, Sparacio (2014)).

Geotrogus pellegrinensis Brenske, 1893

Distribution: Sicily: Provinces of Palermo and Trapani (Endemic, Sparacio (2014)).

Geotrogus sicelis Blanchard, 1851

Distribution: Sicily, Ustica and Pantelleria islands (Endemic, Carpaneto et al. (2021)).

Genus *Holochelus* Reitter, 1889

Holochelus (*Miltotrogus*) *fraxinicola* (Hagenbach, 1825)

Distribution: Peninsular Italy and Sardinia (Carpaneto et al. 2021, Dutto et al. 2024).

Holochelus (*Miltotrogus*) *vernus* (Germar, 1824)

Distribution: Present presumably only in Friuli Venezia Giulia (Ballerio et al. 2011).

Genus *Rhizotrogus* Latreille, 1825

Rhizotrogus aestivus (Olivier, 1789)

Distribution: Continental and Peninsular Italy (Carpaneto et al. 2021).

Rhizotrogus cicatricosus Mulsant, 1842

Distribution: Continental and Central Italy (Carpaneto et al. 2021). Doubtful presence in Sardinia (Rattu et al. 2020).

Rhizotrogus maculicollis (Villa and Villa, 1833)

Distribution: Continental and Central Italy (Carpaneto et al. 2021), excluded from the Sardinian fauna (Rattu et al. 2020).

Rhizotrogus marginipes Mulsant, 1842

Distribution: Continental Italy (Carpaneto et al. 2021).

Rhizotrogus bentelrhianus Sparacio, Muscarella, Di Giulio and Ruzzier, sp. nov.

Distribution: Sicilian Channel: Pantelleria Island (Endemic).

Rhizotrogus romanoi Sabatinelli, 1975

Distribution: Calabria and Sicily (Endemic, Muscarella and Sparacio (2024)).

Rhizotrogus sassariensis Perris, 1869

Distribution: Sardinia and the Tyrrhenian coastal zone (Tuscany, Latium, Campania) (Subendemic, Carpaneto et al. (2021))

Rhizotrogus siculus Baraud, 1970

Distribution: Calabria and Sicily (Endemic, Carpaneto et al. (2021)).

Rhizotrogus tatianae Muscarella and Sparacio, 2024

Distribution: Sicily: Mount Etna (Endemic, Muscarella and Sparacio (2024)).

Rhizotrogus tedeschii Uliana and Gallerati, 2022

Distribution: Basilicata and Calabria (Endemic, Uliana and Gallerati (2022)).

Figure 4. doi

Rhizotrogus bentelrhianus sp. nov.: **A** Paronarmic view of the collecting habitat on Monte Gibelè, contrada Dietro l'isola; **B** Detail of the location where most of the specimens were collected; **C** Male of *R. bentelrhianus* feeding on *Cistus* sp. leaves during the night.

Discussion

The description of this new taxon shows how important it is to investigate 'old unresolved questions', including through continuous field research and the collection of new material. In particular, the latter aspect demonstrates how, in this group of beetles, as for many other organisms, it is important to eliminate cognitive bias derived from old or fortuitous records to ensure adequate sampling, which is otherwise impossible (Brizio et al. 2020). Nevertheless, this new species is proof of the enormous biodiversity heritage of the Italian territory that remains to be discovered, enhanced and protected, particularly in southern Italy and the islands. As seen from the checklist below, of the 48 species known thus far for Italy, 58% are endemic or subendemic, with a particular concentration in the Italian peninsula and islands. Many of these species have restricted, almost punctiform distributions and, for the majority, nothing is known about their biology. Therefore, several species are often threatened by habitat destruction and fragmentation. However, none or almost none of them is included in the Red and protection lists and the most protected species remain as those found in pre-existing protected areas.

Acknowledgements

The authors thank Sonia Anelli and Andrea Bidittu of Pantelleria National Park for granting research permits on the island. Calogero Muscarella acknowledges Simone Costa, Mario Lo Valvo and Giuseppe Mascarello for providing one *R. bentelrhianus* specimen collected during their field activities. Sincere thanks go to Aleš Bezděk (IECA), Christoph Germann (NHMB), Gyorgy Makranczy (HNHM), Mercedes París (Museo Nacional de Ciencias Naturales Madrid, Spain), Olivier Montreuil (MNHN), José Ignacio López Colón (Rivas-Vaciamadrid, Spain) and Wael Ben Aba (Tunis, Tunisia) for sharing photos or sending on loan the important comparative material used in this study. Enrico Ruzzier and Andrea Di Giulio acknowledge the support of the NBFC to the University of Roma Tre, Department of Science, funded by the Italian Ministry of University and Research, PNRR, Missione 4 Componente 2, 'Dalla ricerca all'impresa', Investimento 1.4, Project CN00000033.

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